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Upper Primary Division Round 2

Questions 1 to 5, 4 marks each

1. What is the value of $666 + 669 + 699 + 999$?
- (A) 2433 (B) 2970 (C) 2973 (D) 3030 (E) 3033

Answer : _____

2. The positive integers a , b , c and d are such that

$$\frac{1}{a-2013} = \frac{1}{b+2014} = \frac{1}{c-2015} = \frac{1}{d+2016}.$$

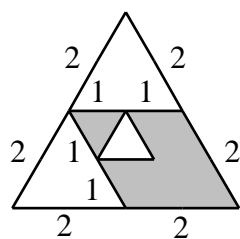
Which of the following orderings of these four numbers is correct?

- (A) $b < d < a < c$ (B) $d < b < a < c$ (C) $d < a < b < c$
 (D) $d < b < c < a$ (E) $b < d < c < a$

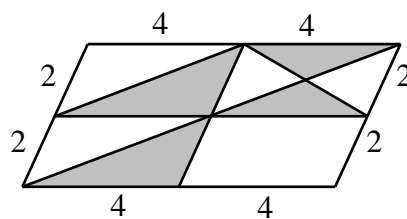
Answer : _____

3. In which of the following diagrams is the total area of the shaded parts equal to the total area of the unshaded parts?

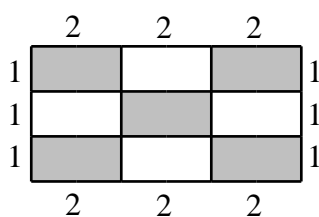
(A)



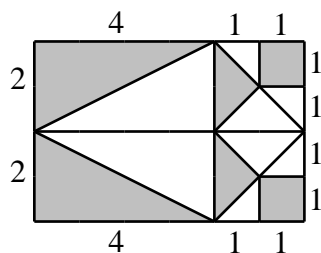
(B)



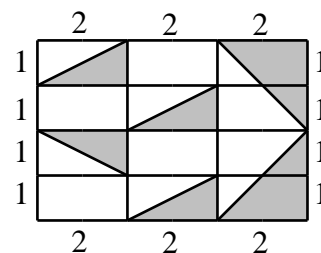
(C)



(D)

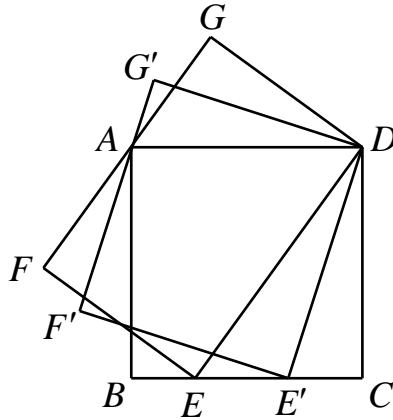


(E)



Answer : _____

4. E is a variable point on the side BC of a square $ABCD$. $DEFG$ is a rectangle with FG passing through A . As the point E moves from B towards C , how does the area of $DEFG$ change?



- (A) Remaining constant
 (B) Steadily increasing
 (C) Steadily decreasing
 (D) Increasing and then decreasing
 (E) Decreasing and then increasing

Answer : _____

5. Jerry and George are jogging along a circular path. If Jerry runs another 400 m, he will have completed 2 laps. If George runs another 500 m, he will have completed 3 laps. The total distance they have covered is 100 m more than 4 laps. What is the length, in m, of 1 lap?
 (A) 1000 (B) 900 (C) 800 (D) 750 (E) 700

Answer : _____

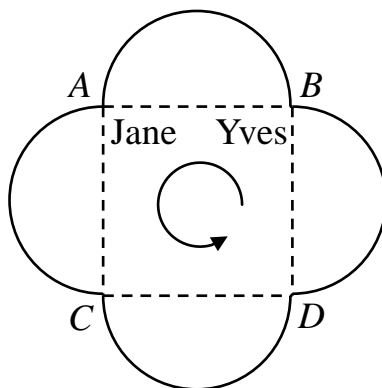
Questions 6 to 13, 5 marks each

6. A worker makes 6000 dollars in basic wages plus overtime payment. His overtime payment is two-thirds of his basic wage. How much, in dollars, is his basic wage?

Answer : \$ _____

UP 3

7. The diagram shows a path consisting of four semi-circular arcs. Each arc is of length 100 m and uses a different side of a square as its diameter. Initially, Jane is at A and Yves at B . They start walking counter-clockwise at the same time. Jane's speed is 120 m per minute and Yves's is 150 m per minute. Each pauses for 1 second whenever they are at the points A , B , C or D . How many seconds after starting will Yves catch up for the first time with Jane?



Answer : _____ seconds

8. There are three kinds of bottles, holding 0.4 L, 0.6 L and 1 L respectively. The total capacity of several bottles, at least one each kind, is 18 L. How many possible values of the number of bottles holding 0.6 L are there if there is at least one bottle of each kind?



Answer : _____ cm^2

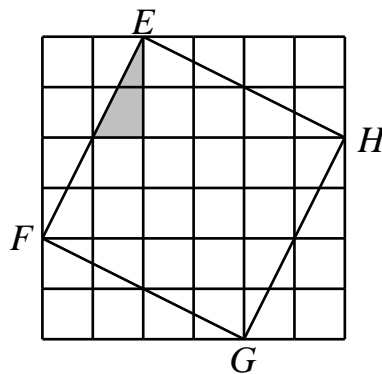
9. Marion chooses three different non-zero digits and form all possible three-digit numbers with them. If m is the sum of these numbers and n is the sum of the digit-sums of these numbers, what is the value of $\frac{m}{n}$?

Answer : _____ expressions

10. How many of the integers from 100 to 999 inclusive have the property that the sum of the units digit and the hundreds digit is equal to the tens digit?

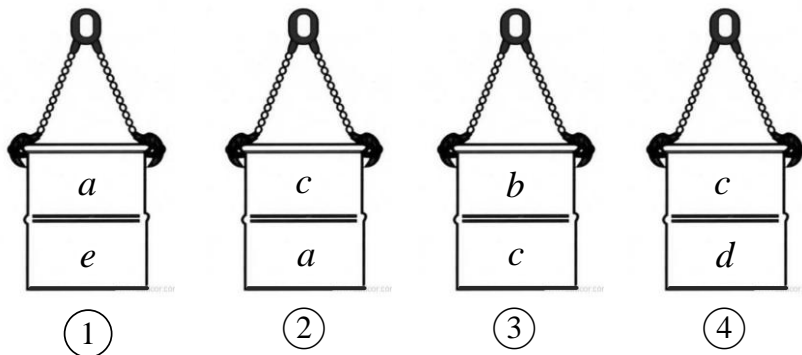
Answer : _____

11. The diagram shows a shaded triangle in a 6 by 6 board. How many triangles are there such that their edges are all grid lines of the board or the edges of $EFGH$, and their angles are equal respectively to the angles of the shaded triangle? You should also count the shaded triangle.



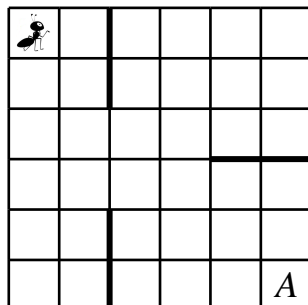
Answer : _____

12. There are 26 toys to be distributed into five boxes, with a, b, c, d and e toys in them respectively, where a, b, c, d and e are positive integers. The diagram shows four combinations of two boxes at a time. The total number of toys in the two boxes exceeds 11 in all but the second case. How many different distributions are there?



Answer : _____

13. The diagram shows a 6 by 6 board with three barriers. An ant is at the top left corner and wishes to reach the bottom right corner. It may only crawl between squares which share a common side, and only towards the bottom or the right. It cannot pass through any barrier. How many different paths can it follow?



Answer : _____ paths

Questions 14 to 15, 20 marks each
(Detailed solutions are needed for these two problems)

14. What is the largest integer n such that there is a multiple of 4 less than n^2 but greater than $n^2 + \frac{2016}{n^2}$?

Answer : _____

UP 6

15. Each of the integers from 1 to 16 inclusive is put in a different square of a 4 by 4 table. For any two squares sharing a common side, the sum of the numbers in them is recorded. What is the maximum value of the smallest one among the recorded numbers?

Answer : _____
